Ordering number: EN3994B

Monolithic Linear IC

LA7975

PAL SIF Converter Circuit for TV and VCR Multi-system

Overview

The LA7975 is an IC that converts PAL SIF signals (5.5 MHz, 6 MHz, and 6.5 MHz) to 6 MHz. For the sake of high sound quality, this IC uses a unique mixer technique to supress interference from NICAM signals.

Functions

- Mixer, amplifier, oscillator, oscillator mute

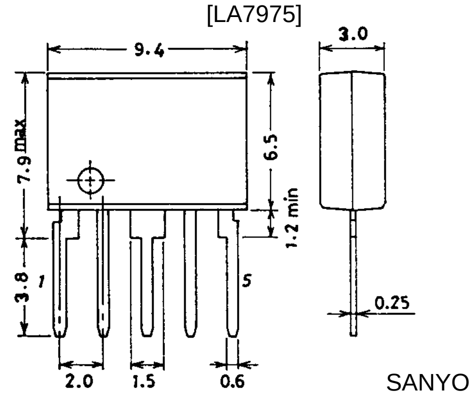
Features

- Resistant to interference by NICAM signals
- Small SIP-5 package
- Wide range of usage voltage (5 V to 12 V)

Package Dimensions

unit : mm

3042C-SIP5



Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		13.2	V
Maximum feed current	I_5 max		3	mA
	I_4 max		1	mA
Allowable power dissipation	Pd max	Ta ≦ 70°C	200	mW
Operating temperature	Topr		–20 to +70	°C
Storage temperature	Tstg		–40 to +150	°C

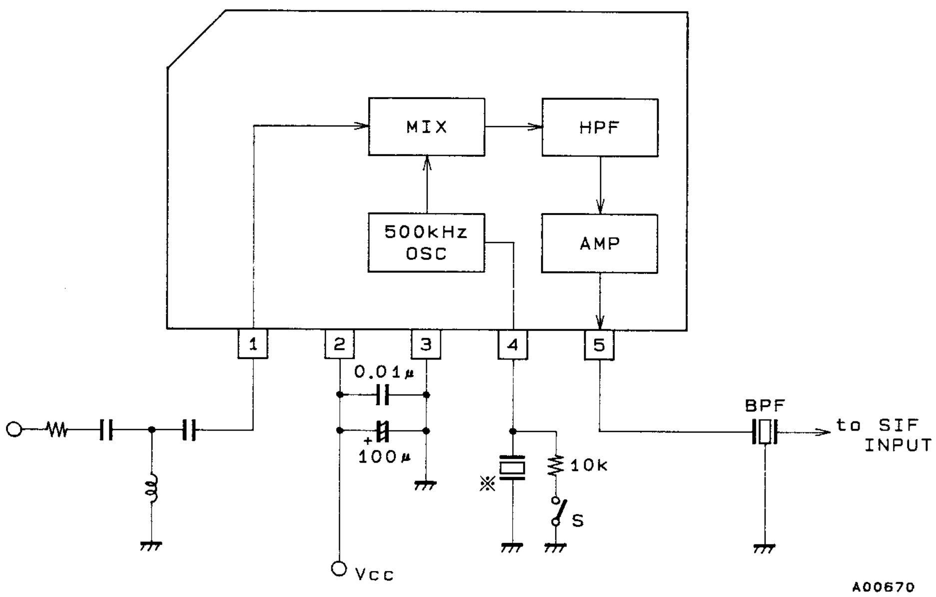
Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		9	V
Operating voltage range	V_{CC} op		5 to 12	V

Operating Characteristics at Ta = 25°C, V_{CC} = 9 V

Parameter		Symbol	Conditions	Test point	min	typ	max	Unit
Current drain		I_{CC}		Pin 2	5	6.5	9	mA
Conversion gain	5.5 MHz	G5.5	80 dB/µV input	Pin 5	10	13.5	17	dB
	6.5 MHz	G6.5	80 dB/µV input	Pin 5	10	13.5	17	dB
	6.0 MHz	G6.0	80 dB/µV input, Pin 4 grounded with 10 kΩ	Pin 5	18.5	22	25.5	dB
Oscillation level		V_{OSC}		Pin 4	15	36	80	mVp-p
Maximum output level		V_O max	5.5 MHz 100 dB/µV input	Pin 5	109	112	115	dB/µV
Input impedance		Ri	5.5 MHz input			4.8		kΩ
Pin voltages		V1		Pin 1	2.6	3	3.4	V
		V4		Pin 4	7.6	8	8.4	V
		V5		Pin 5	7.2	7.6	8	V
500 kHz level difference relative to 6 MHz		OSC leak		Pin 5	30	44		dB
Maximum input level		V_{IN} max			90			dB/µV
Oscillation stop current		I_4		Pin 4			300	µA

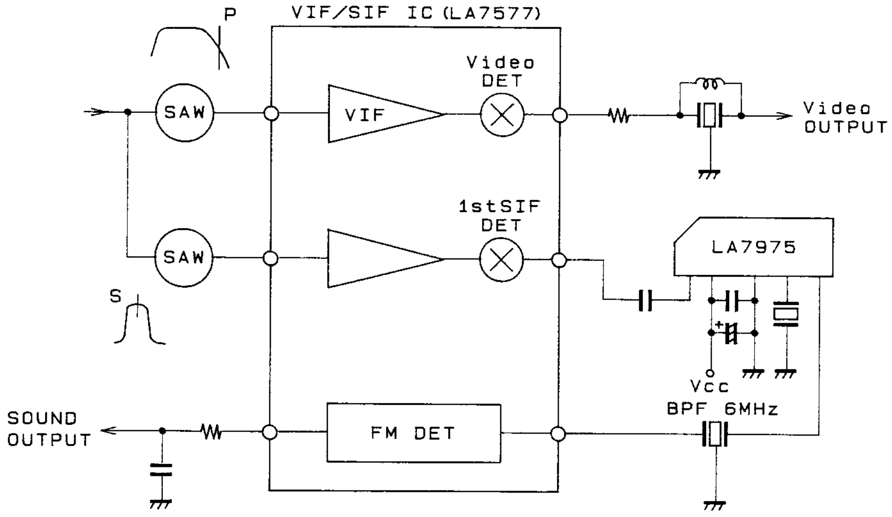
Sample Application Circuit



Unit (resistance: Ω, capacitance: F)

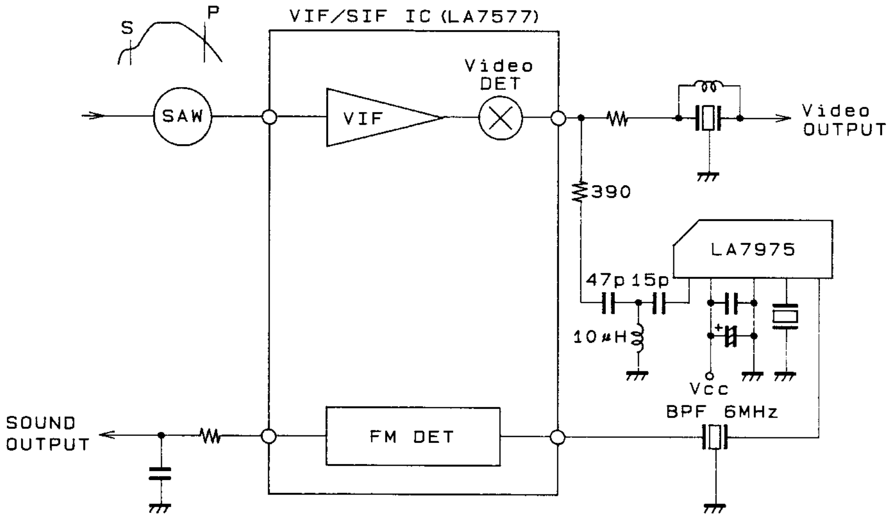
※ Oscillator
500 kHz CSB503E5 Murata Industries, Ltd.
1.5 MHz CSA1.500MK2 Murata Industries, Ltd.
500 kHz EFOA500K04S Matsushita Electric, Ltd.

Reference Example 1



A00671

Reference Example 2



Unit (resistance: Ω, capacitance: F)

A00672

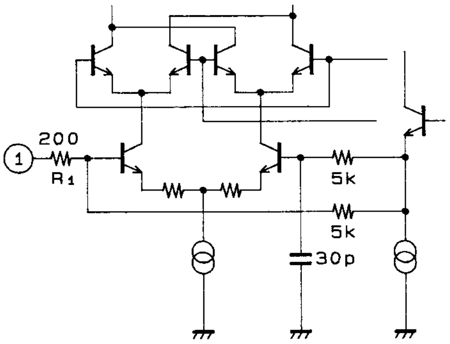


Figure 1

Unit (resistance: Ω, capacitance: F)

- Pin 1 is the SIF input pin.
  The filter in Figure 2 can be connected to the input section to improve the buzz characteristic.
  Figure 3 shows the characteristics for the filter in Figure 2.
  If C1 is too small, the buzz characteristic improves for normal input, but the filter cuts into the sound carrier and the buzz characteristic deteriorates for the P/S (picture/sound carrier) ratio.
  Use C1 ≒ 20 pF to 47 pF.

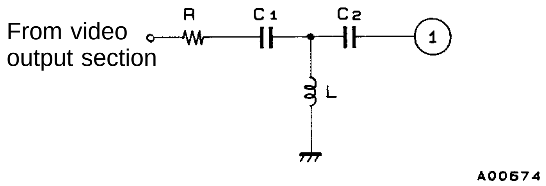


Figure 2

Filter characteristic

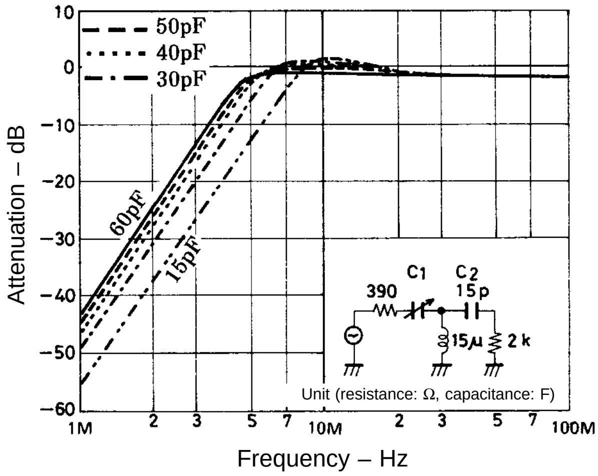


Figure 3

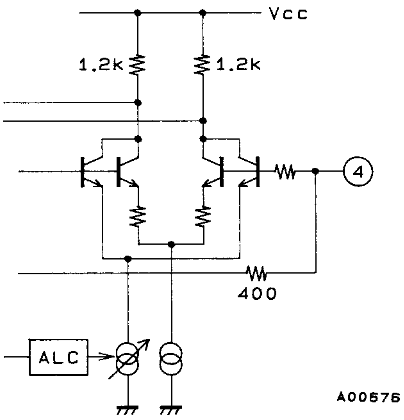


Figure 4 Unit (resistance: Ω)



Figure 5

(Pin 4 oscillation waveform)

- Pin 4 is the ceramic oscillator pin.
  To make the oscillation waveform approach a sine wave,the oscillation level is controlled internally.
  Oscillation levels of 15 to 80 mVp-p at Pin 4 give the waveform shown in Figure 5.
  To stop oscillation, attach an external resistor as in Figure 6 and switch S1 on.

  Here are the conditions for handling multiple systems.

Input frequency	Oscillator	Pin 5 output
5.5 MHz	500 kHz	6 MHz
6.0 MHz	Oscillation stop	6 MHz (pass through)
6.5 MHz	500 kHz	6 MHz
4.5 MHz	1.5 MHz	6 MHz

Figure 7

Figure 8 shows a proposed multi-system

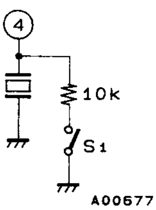


Figure 6

Unit (resistance: Ω)

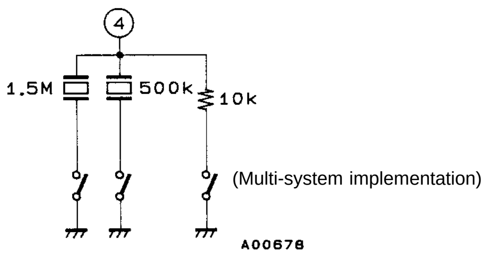


Figure 8 Unit (resistance: Ω)

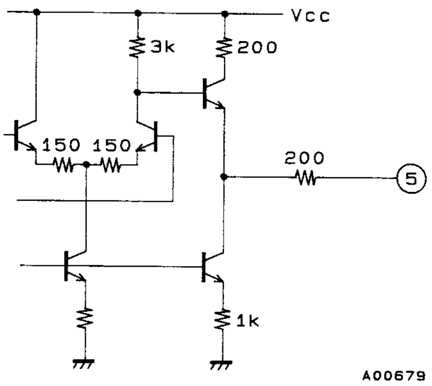


Figure 9 Unit (resistance: Ω)

- Pin 5 is the output pin. The output from Pin 5 is input to the SIF via a 6 MHz bandpass filter (BPF).
  When 5.5 MHz is input to Pin 1, the spectrum shown in Figure 10 is obtained at Pin 5. Even if there is a 5.85 MHz NICAM signal, the D/U (desirable/undesirable) ratio at Pin 5 increases and the buzz characteristic does not deteriorate.

  When 6 MHz is input at Pin 1 and there is a 6.552 MHz NICAM signal, then 6.552 MHz is mixed with 500 kHz to make 6.052 MHz. This becomes an interference signal and is within the band for 6 MHz. Therefore,for 6 MHz input, Pin 4 is grounded with 10 kΩ to stop the oscillation and pass through the input signal 6 MHz as is.

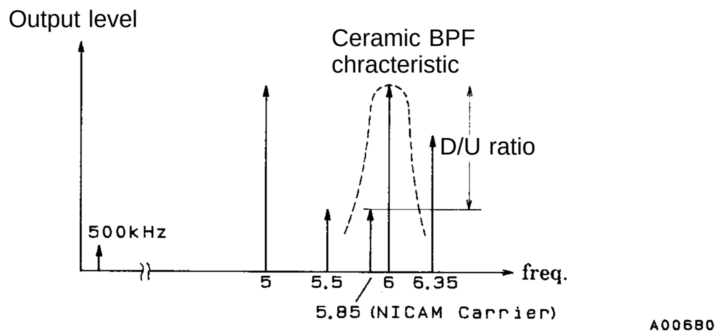


Figure 10 (5.5 MHz input)

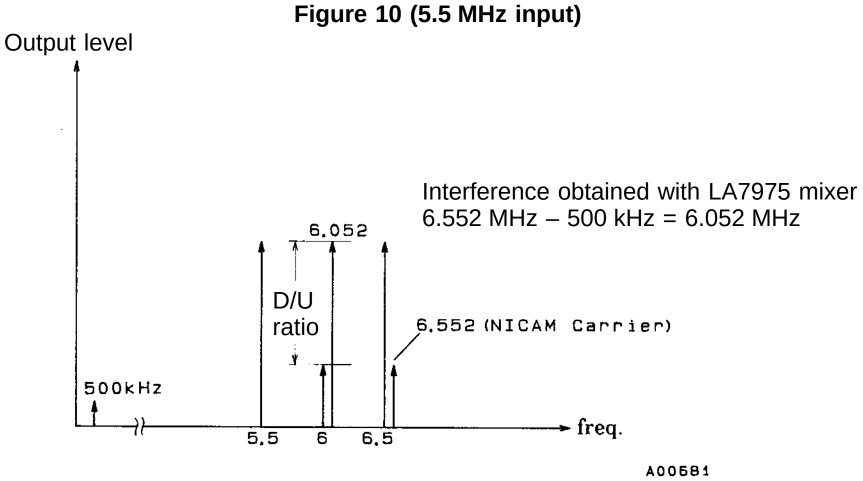
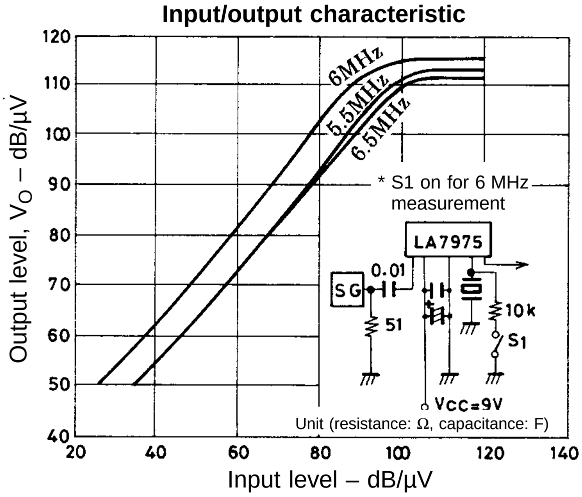


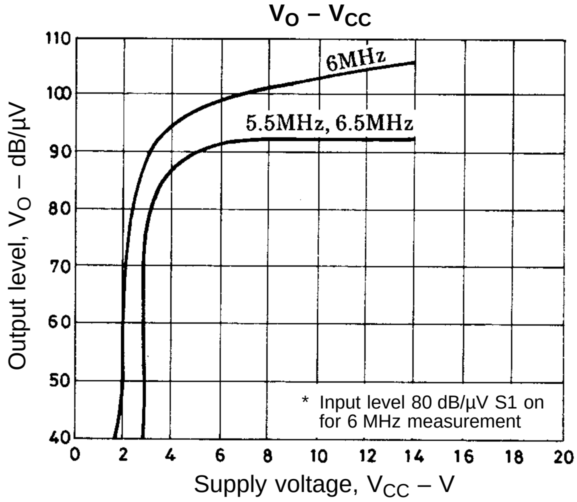
Figure 11 (6 MHz input)

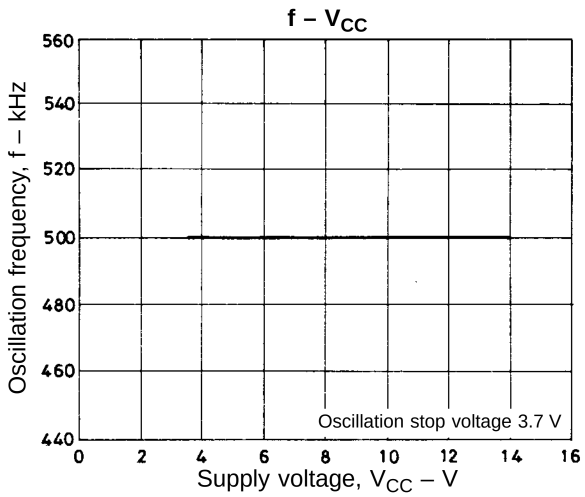
Reference Characteristic Diagram

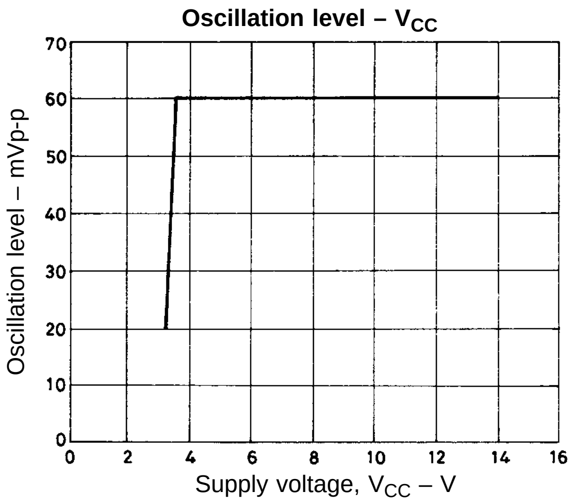
Input/output characteristic

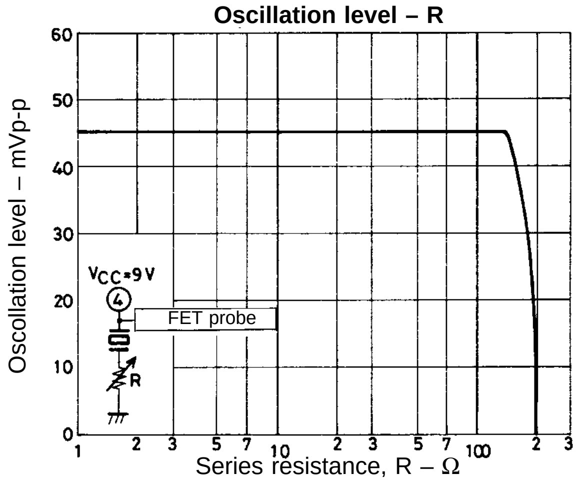


V_O – V_{CC}









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